INSTRUCTION MANUAL

OVERVOLTAGE PROTECTORS

LMOV-1, LMOV-2
AND LMOV-3
LHOV-4, LHOV-5
AND LHOV-6

MP MASTER
MA28795

LAMBDA

LAMBDA ELECTRONICS CORP.–MELVILLE, L. I., N. Y.

GENERAL INFORMATION

The Lambda overvoltage protector prevents damage to the load caused by excessive power supply output voltage due to improper adjustment, improper connection, or failure of the power supply. Load protection is accomplished automatically by effectively short circuiting the output terminals of the power supply when a preset limit voltage has been exceeded.

Although designed specifically for use with the Lambda LM, LP, LPD, LR, LS, LK and LH series power supplies listed below, the overvoltage protector can be used with other similarly rated current-limited power supplies when certain basic precautions are observed. When mounted on a 1/16 inch thick aluminum heat sink of at least 20 square inches, in an ambient temperature of up to 80°C, the unit can withstand a fault current of 35 amperes for a period of one minute, or of 80 amperes for a period of one second. Consult the factory for specific other-model application information.

The overvoltage protector will not provide protection against overvoltage conditions caused by storage batteries or other power sources used in conjunction with the Lambda power supply. Whenever additional power sources must be used with the Lambda power supply and overvoltage protector combination, consult the factory for proper installation information.

The adjustable voltage range of each overvoltage protector for specific power supply output voltage ranges are listed below.

OV MODEL	ADJUSTABLE VOLTAGE RANGE	SUGGESTED P. S. OUTPUT VOLTAGE RANGE	LAMBDA POWER SUPPLY MODELS
LMOV-1	3 - 8v	1.8 - 6.0v	LM series
LMOV-2	6 - 20v	4.2 - 16.0v	LM - A thru
LMOV-3	18 - 70v	15.0 - 60.0v	LM - E
LHOV-4*	3 - 24v	1.8 - 20.0v	LH 118A, 119A, 121A, 122A; LP410, 411; LK340A, 341A; LPD421; LR612FM; LS511, 512
LHOV-5*	3 - 47v	1.8 - 40.0v	LH 124A, 125A; LP412; LK342A, 343A; LPD 422; LR613FM; LS513
LHOV-6*	3 - 70v	1.8 - 60.0v	LH 127A, 128A; LP413; LK344A, 345A; LPD423

*THESE "OV" UNITS WHEN USED WITH "LK AND LH" SERIES, ARE USED ONLY ON "A" SUFFIX LK AND LH MODELS

THEORY OF OPERATION

Divider network R1, R2, R3, R4 and R7 attenuates the power supply output voltage. When the power supply increases above the overvoltage limit set by R1, the attenuated voltage of the divider network also increases, biasing transistor Q1 on. Q1 in turn biases Q2 on through resistor R10. Q2 supplies gate current to SCR-1, turning it on, causing an effective short circuit across the supply output terminals. This in turn causes the voltage at the power supply terminals to drop, protecting the load from excessive supply output voltage. SCR-1 conducts until the power supply is turned off, or until a fusible link in the circuit clears, causing power to be cut off.

INSTALLATION AND ADJUSTMENT

Install the Overvoltage Protector as Follows:

1. Position the protector on the power supply, figure 1 or 2, so that the unit is located adjacent to the supply output terminal block and the red and black leads are next to the terminal block.
2. Connect and solder red lead to the +V output terminal and the black lead to the -V output terminal of the power supply.
3. Align the two 6-32 captive screws located on the protector, with the two existing pre-tapped 6-32 holes in the LM power supply and firmly tighten screws to secure the protector in position. See figure 3.

Adjust the Overvoltage Protector Voltage-Protection Point as Follows:

1. Turn voltage adjust control on overvoltage unit fully clockwise.

2. The recommended voltage-protection point is 115% of normal power supply operating voltage plus one volt. Compute this value for the operating voltage being used.

3. Turn on the power supply, and raise the output voltage to the desired voltage-protection point; monitor the power supply output voltage to assure correct voltage. If the power supply does not have an adequate adjustment range omit steps 4 and 5, and continue with step 6 below.

4. Slowly turn the voltage adjust control of the Overvoltage Protector counterclockwise until the power supply output voltage, as indicated by the monitoring device, suddenly drops.

5. The voltage-protection point is now set. Remove power supply input power, so that overvoltage protector will reset. Reduce power supply output voltage setting before re-applying input power.

6. If the power supply output voltage adjustment range does not extend to the protection-point voltage computed in step 2, proceed as follows:

   a) Turn on power supply and raise output voltage to the normal operating voltage, taking care to monitor the power supply output voltage.

   b) Slowly turn the voltage adjust control of the Overvoltage Protector counterclockwise until the power supply voltage, as indicated by the monitor, drops suddenly.

   c) Refer to table below, select appropriate volts/turn ratio, and turn voltage adjust control on Overvoltage Protector clockwise by the number of turns equivalent to 1 volt plus 15% of the operating voltage.

MODEL	VOLTS/TURN
LMOV-1	0.3
LMOV-2	0.8
LMOV-3	2.7
LHOV-4	2.3
LHOV-5	4.6
LHOV-6	6.9

For Example:

When using a power supply with an output voltage setting of 5 volts together with Overvoltage Protector LMOV-1, calculate as follows:

$$T = \frac{1 + .15\ (OV)}{V/T}$$

where

T = turns of voltage adjustment control on protector

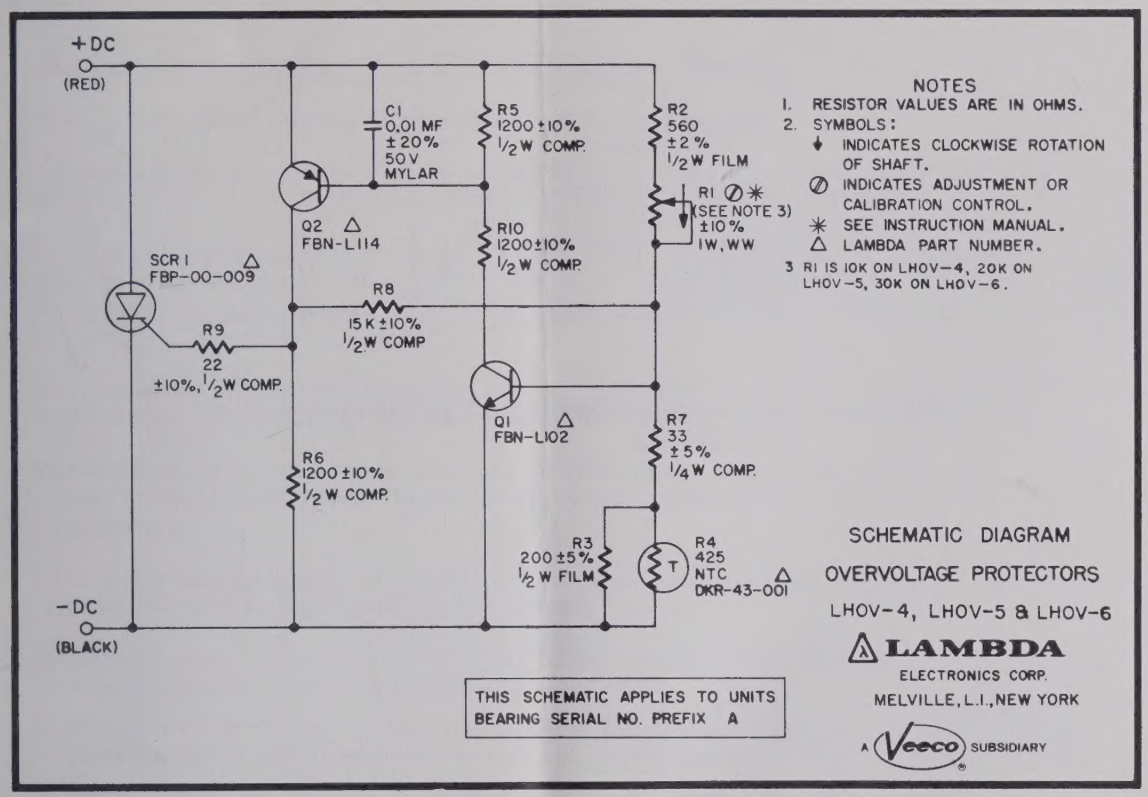
OV = operating voltage of power supply

V/T = volts/turn ratio from table

$$T = \frac{1 + .15\ (5)}{0.3} = 5.8$$

Rotate voltage adjustment control 5.8 turns in clockwise direction to obtain a voltage setting 1.8 volts above the 5-volt power supply setting, or 6.8 volts.

   d) With voltage adjustment complete, momentarily remove input power to the supply so that the Overvoltage Protector will reset.



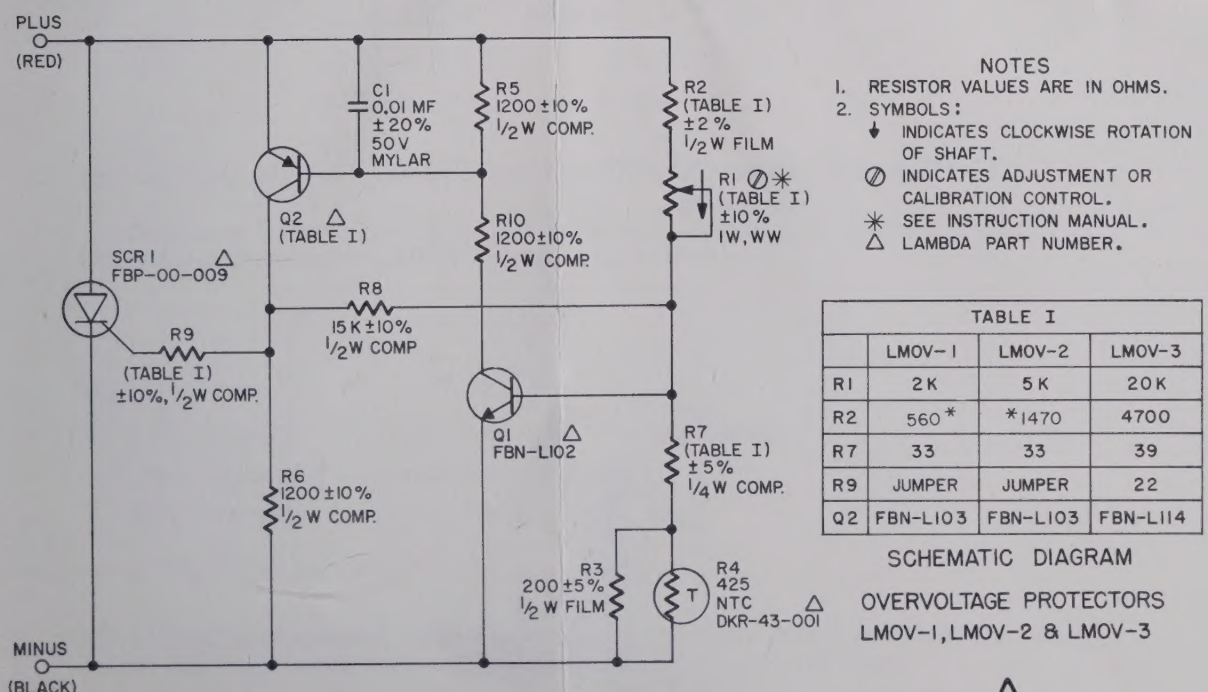


TABLE I			
	LMOV-1	LMOV-2	LMOV-3
R1	2K	5K	20K
R2	560 *	*1470	4700
R7	33	33	39
R9	JUMPER	JUMPER	22
Q2	FBN-L103	FBN-L103	FBN-L114

*R2 ON LMOV-1 WAS 750 OHMS, R2 ON LMOV-2 WAS 1300 OHMS

THIS SCHEMATIC APPLIES TO UNITS BEARING SERIAL NO. PREFIX A

SCHEMATIC DIAGRAM
OVERVOLTAGE PROTECTORS
LMOV-1, LMOV-2 & LMOV-3

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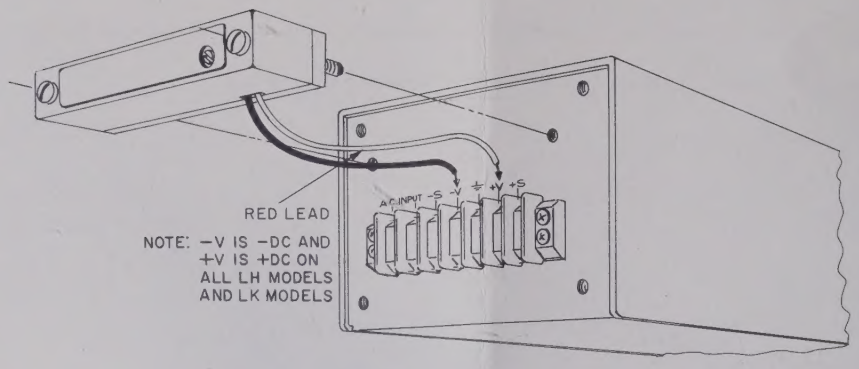


Figure 1. Overvoltage Protector, Typical Horizontal Mounting

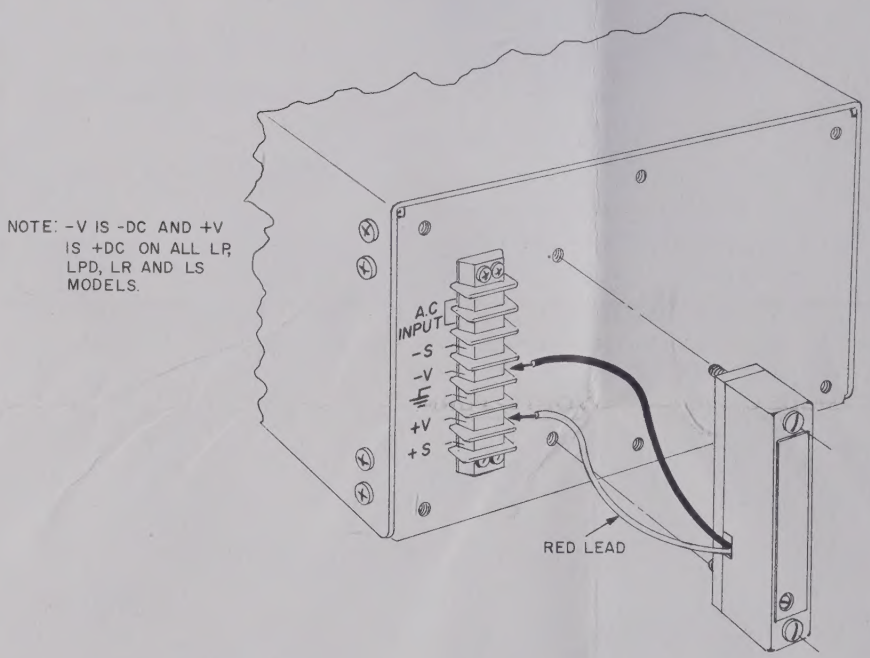


Figure 2. Overvoltage Protector, Typical Vertical Mounting

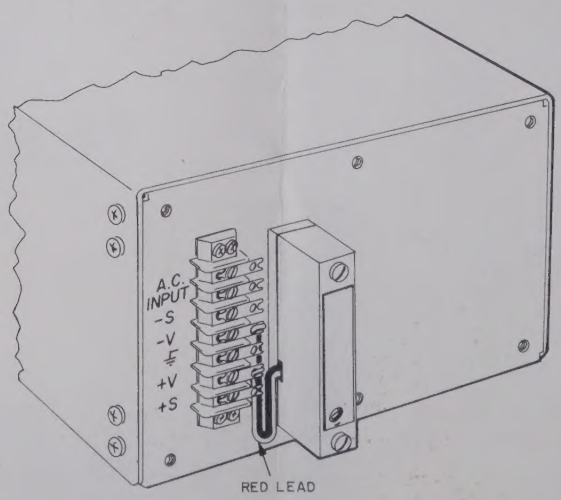
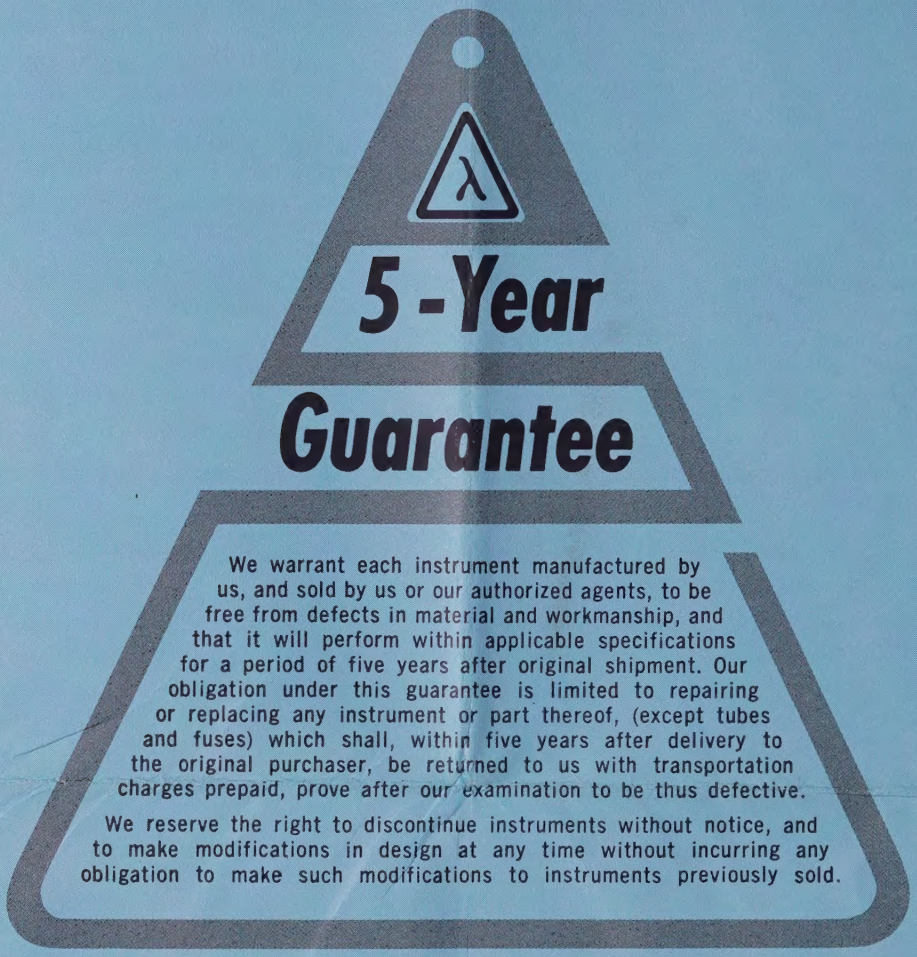


Figure 3. Overvoltage Protector, Typical Installation


5-Year
Guarantee
We warrant each instrument manufactured by us, and sold by us or our authorized agents, to be free from defects in material and workmanship, and that it will perform within applicable specifications for a period of five years after original shipment. Our obligation under this guarantee is limited to repairing or replacing any instrument or part thereof, (except tubes and fuses) which shall, within five years after delivery to the original purchaser, be returned to us with transportation charges prepaid, prove after our examination to be thus defective.
We reserve the right to discontinue instruments without notice, and to make modifications in design at any time without incurring any obligation to make such modifications to instruments previously sold.

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